Listing of the Claims

1. (Previously Presented) An image processing system, for correlating shapes in multi-dimensional images **(m-D)**, comprising image data processing means for estimating a similarity measure including computing means for:

estimating two image signals **(f($\underline{x}$), g($\underline{y}$))** representing shapes defined in respective windows **(W1, W2)** in two multi-dimensional images;

using a Hermite Transform **(HT)** applied to both said image signals for performing an evaluation of two first sets of scalar valued Hermite coefficients ($\mathbf{f_I, g_I, F_I, G_I}$), from which a combination yields a transformed set of scalar valued Hermite coefficients $\{\mathbf{K_I}\}$;

applying an inverse of the Hermite Transform ($\mathbf{HT^{-1}}$) to the transformed set of scalar valued Hermite coefficients $\{\mathbf{K_I}\}$ to compute a windowed correlation function **(K($\underline{y}$))**; and estimating a maximum of said windowed correlation function as the similarity measure to correlate the shapes;

displaying the correlated shapes and processed images; and

repeating the steps of determining the windowed correlation function, as many times as necessary in order to reach a best possible windowed correlation function by modifying at least one rotation matrices ($\mathbf{R_1}$, $\mathbf{R_2}$), at least one scaling factor ($\{ z_k \}$) and by increasing a number of indices **(I)** if more accuracy is needed.

2. (Previously Presented) The system of Claim 1, comprising data processing means for ordering the scalar valued Hermite coefficients ($\mathbf{K_I, f_I, g_I}$) in such a way that low-order coefficients code coarse shape information whereas high order coefficients code fine shape information.

3. (Previously Presented) The system of claim 1, wherein a class of simultaneous transformations, which is dealt with for any data dimension m, comprises:

translation and a scale-change.

4. (Previously Presented) The system of claim 1, wherein a class of simultaneous transformations, which is dealt with for data dimensions higher than 1-D, comprises:

translation, scale-change, and, in addition

rotation and anisotropic scale change.

5. (Original) The system of Claim 4, comprising, for a number of variables superior to one corresponding to data dimensions higher than 1-D, data processing means for:

processing the first two sets of scalar valued Hermite coefficients ($\mathbf{f_I}, \mathbf{g_I}$) by applying at least one rotation matrix (**R1**, **R2**) which converts at least one of said two sets of scalar valued Hermite coefficients ($\mathbf{f_I}, \mathbf{g_I}$) into a new set of scalar valued Hermite coefficients ($\mathbf{F_I}, \mathbf{G_I}$) corresponding to a rotated version of at least one of the shapes;

estimating a transformed set of scalar valued Hermite coefficients $\{\mathbf{K_I}\}$ from the new sets of scalar valued Hermite coefficients ($\mathbf{F_I}, \mathbf{G_I}$) corresponding to the rotated versions of the shapes.

6. (Previously Presented) The system of claim 1, comprising data processing means for:

setting the number of scalar valued Hermite correlation coefficients $\{\mathbf{K_I}\}$ to use and the set of translation parameters ($\underline{\mathbf{v}}$) for which the correlation function ($\mathbf{K}(\underline{\mathbf{v}})$) is to be computed in order to provide a desired accuracy, according to which for a coarse estimate of only low order indices (**I**) and a limited number of sampling points for translation parameters ($\underline{\mathbf{v}}$) are used, while the maximum value of the correlation function ($\mathbf{K}(\underline{\mathbf{v}})$), among all calculated values, provides the correlation measure and the corresponding optimum translation parameter ($\underline{\mathbf{v}}$).

7. (Previously Presented) The system of Claim 1, comprising data processing means for:

setting the number of scalar valued Hermite correlation coefficients $\{\mathbf{K_I}\}$ to use, when only translations in the direction defined by a given co-ordinate number (n) is involved, comprising limiting said evaluations of scalar valued Hermite correlation coefficients $\{\mathbf{K_I}\}$ to multi-indices $\mathbf{I=(i_1,\ldots,i_m)}$ for which $\mathbf{i_k=0}$ for all co-ordinate numbers $\mathbf{k \neq n}$, wherefrom computing a one dimensional correlation function $(\mathbf{K(v_n)})$ depending on the one dimensional co-ordinate $(\mathbf{v_n})$ of the m-dimensional translation parameters $(\underline{\mathbf{v}})$.

8. (Cancelled)

9. (Cancelled)

10. (Currently Amended) An image processing system, for correlating shapes in multi-dimensional images **(m-D)**, comprising image data processing means for estimating a similarity measure including:

computing means for estimating two image signals $(\mathbf{f(x)}, \mathbf{g(y)})$ representing shapes defined in respective windows (**W1**, **W2**) in two multi-dimensional images;

computing means for using a Hermite Transform (**HT**) applied to both said image signals for performing an evaluation of two first sets of scalar valued Hermite coefficients $(\mathbf{f_I}, \mathbf{g_I}, \mathbf{F_I}, \mathbf{G_I})$, from which a combination yields a transformed set of scalar valued Hermite coefficients $\{\mathbf{K_I}\}$;

computing means for applying an inverse of the Hermite Transform $(\mathbf{HT^{-1}})$ to the transformed set of scalar valued Hermite coefficients $\{\mathbf{K_I}\}$ to compute a windowed correlation function $(\mathbf{K(v)})$ and estimating a maximum of said windowed correlation function as the similarity measure to correlate the shapes;

means for displaying the correlated shapes and processed images; and

further comprising data processing means for performing an evaluation of a warping law for correlating a first and a second complex shape in multi-dimensional images (m-D), including a determination of more than one window (**W1**) for the first shape

and ~~the~~ a determination of corresponding candidate windows (**$W2_k$**) for the second shape, and further comprising data processing means for performing ~~the~~ an estimation of the Hermite Transform (**K_I**) for the evaluation of a windowed correlation function **K(y),** including steps of using a Hermite Transform (**HT**) of two image signals (**f(x), g(y)**) defined in respective windows (**W1, W2**), wherefrom data processing means ~~for performing~~ performs an evaluation of the inverse Hermite Transform (**HT^{-1}**) to compute said windowed correlation function (**K (y)**), which is used to determine a best windows candidate, and comprising data processing means for performing the determination of the best warping law by iteration of these steps in order to match the first and second complex shapes.

11. (Previously Presented) An image processing method comprising an evaluation of a Hermite Transform (**K_I**) for the evaluation of a windowed correlation function **K(y),** including steps of using the Hermite Transform (**HT**) of two image signals (**f(x)**, **g(y)**) representing shapes defined in respective windows (**W1**, **W2**) in multi-dimensional images (m-D), wherefrom a step of evaluating an inverse of the Hermite Transform (**HT^{-1}**) is performed to compute said windowed correlation function (**K(y)**), correlating the shapes, repeating the steps of determining the correlation function, as many times as necessary in order to reach a best possible correlation function by modifying at least one rotation matrices (**R_1**, **R_2**), at least one scaling factor ($\{ z_k \}$) and by increasing a number of indices (**I**) if more accuracy is needed, and visualizing the correlated shapes and/or processed images.

12. (Previously Presented) The system of Claim 1, comprising acquisition means for acquiring medical image data.

13. (Previously Presented) A computer program product having a set of instructions stored on a computer readable memory medium, when in use on a general-purpose computer, to cause the computer to perform the steps of:

using a Hermite Transform (**HT**) of two image signals (**f(x)**, **g(y)**) representing shapes defined in respective windows (**W1**, **W2**) in multi-dimensional images (m-D),

wherefrom a step of evaluating an inverse of the Hermite Transform (**HT^{-1}**) is performed to compute a windowed correlation function (**$K(\underline{v})$**), correlating the shapes, repeating the steps of determining the correlation function, as many times as necessary in order to reach a best possible correlation function by modifying at least one rotation matrices (**R_1**, **R_2**), at least one scaling factor ($\{ z_k \}$) and by increasing a number of indices (**I**) if more accuracy is needed, and visualizing at least one of the correlated shapes and processed images.